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Polynesian Cultural Distributions in New Perspective

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IT HAS been an orthodox view in Oceanian anthropology that the pre-European Polynesians were capable of maintaining regular contacts between islands separated by more than 300 miles of open ocean and that the peopling of Polynesia resulted either entirely or predominantly from voyages of exploration and discovery followed by return voyages to the home islands and then by deliberate large-scale migrations to newly discovered lands. These reconstructions have been challenged by Andrew Sharp's impressively documented recent study (1956), which reviews the achievements and deficiencies of pre-European Polynesian voyaging and argues that Polynesia was peopled as a result of "accidental" landfalls of voyagers lost at sea. Although students, including myself (Vayda 1958), have proposed some modifications of Sharp's thesis, he may be said to have succeeded in shifting the burden of proof to adherents of the orthodox view to such an extent as to make it worthwhile to examine some of the new perspectives that his thesis provides for Polynesian anthropological research. That the thesis does have important implications has been recognized by a number of students (cf. Goodenough 1957; Luomala 1958; Oliver 1957). Some of its implications for the interpretation of Polynesian cultural distributions will be considered in this paper.

An appendix to the paper reproduces the list of cultural traits which have been used by Burrows (1938) for indicating or suggesting degrees of historical relationship among the various Polynesian cultures. None of the listed traits represent complexes of behavior requiring large numbers of people, and therefore it may be said that the traits are likely to have been capable of being "conveyed" from previous homelands and perpetuated in new islands by parties of voyagers making accidental landfalls. Burrows' demonstration of two main Polynesian cultural groupings (a western and a "central-marginal" or eastern) may be made consistent with Sharp's thesis in the manner suggested by Sharp himself (1956:69, 106):

> The Cooks, the Tahiti-Tuamotu area, the Marquesas, Hawaii and New Zealand were worlds apart from Tonga-Samoa, and from one another, apart from occasional accidental arrivals. They derived their basic affinity of culture, including that more abiding cultural feature, basic vocabulary, from the western homeland. Yet the inhabitants of all these groups had common cultural features, including basic words, which were different from those of Western Polynesia. The only reasonable explanation is that these features were developed in an early centre of settlement somewhere in Eastern Polynesia, and were dispersed from there. It would be difficult to conclude otherwise than that this centre was somewhere in the central islands, and that the wide dissemination of these Eastern Polynesian cultural features took place because the maritime arts were developed for local inter-island voyaging, leading to many acci-

dental voyages. . . . A concept of primary west-east settlement by occasional westerlies, with slow increase of population in each main group, followed by accidental settlement of the peripheral groups and islands of the Pacific, is compatible both with the divergences and affinities of language and general culture that existed.

If it is assumed that Sharp's reconstruction of the establishment of a culturally distinctive eastern Polynesian area is correct, a question may still be asked. Why was the cultural distinctiveness of the eastern and western areas not obliterated by people accidentally voyaging between the two areas and making landfalls on already inhabited islands at some considerable time after initial settlement? Sharp (1956:71) has suggested an answer: "No one lot of new arrivals would have sufficient impact to dominate the existing culture or language, but would be absorbed" (cf. Sharp 1956:123; Goodenough 1957: 149). Certain exceptions to this statement will be noted later, but on the whole it seems reasonable. Population could expand considerably on the typical Polynesian high islands, and it is not likely that later accidental voyagers, arriving in small numbers at an island which already had relatively large numbers of people, would be successful in introducing variants of the kinds of culture traits which have been used by Burrows (1938) and others as the main diagnostics of the east-west cultural differentiation.

Some significant points may be made about the kinds of traits which have been regarded as diagnostic. Later arrivals at an island may well have succeeded in introducing certain new food plants or breeding stock (cf. Sharp 1956: Chapter 6) or ways of handling weapons (cf. Sharp 1956:43), since these can be obviously useful innovations. On the other hand, consider Burrows' traits. It should be noted that in most cases it is difficult to discern if a particular trait listed as "western" by Burrows is either more or less adaptive than a corresponding "central-marginal" or eastern trait. Is it manifestly better to mash cooked taro and breadfruit with heavy pounders, as in much of eastern Polynesia, or to eat the vegetables whole or grated, as in much of western Polynesia? Is it better to decorate bark cloth by stamping, as in much of the east, or by tablet rubbing, as in much of the west? Is it better to have right-angle plaiting or oblique plaiting, to have twining in kilts or not to have it, to have a direct or an indirect canoe outrigger attachment, to call the first-born sibling of the same sex "tuakana" or to call him "taokete," to say that the underworld is "Hawaiki" or to say that it is "Pulotu"? Definitive answers cannot yet be given to such questions, but this much may be said about the kinds of traits on Burrows' lists: it is very unlikely that there would have been strong pressures toward substituting traits brought by new arrivals for the traits already established among the local people. Indeed, the more likely tendency in general would be for the newcomers to adopt the prevalent usages of the island, although they might adhere for a while to at least some of their practices and might teach them to their offspring. Because of this last possibility, it would be not surprising if archeologists in one part of Polynesia were to find some isolated specimens of forms (e.g., in adzes) regarded as characteristic of the other part. However, it may still be said about the kinds of

traits under consideration that the dominant or prevalent forms—possibly the only discernible forms in the ethnographic present—would in most islands probably be derived mainly from the culture of the early arrivals and their descendants rather than from the culture of later accidental voyagers.

Is it possible to generalize about the conditions under which this might not apply? A crucial consideration is the relative numbers of the new arrivals and the established local population. The statement has already been made that it is unlikely that later accidental voyagers, arriving in small numbers at an island which already had relatively large numbers of people, would be successful in introducing variants of the kinds of culture traits which appear on Burrows' lists. However, we must also examine the possibility of no very great numerical disparity between the newcomers and the local people.

The important question of the size of the accidental voyaging parties presents some difficulties. A party carried away while fishing often would have comprised only a few people. The numbers of people in parties carried away while going on a social visit or on a military expedition to a nearby island may usually have been greater and may occasionally have been quite considerable, at least at the outset of a voyage. Of course many people might die at sea, even in the case of accidental voyages which terminated in successful landfalls for some people. Evidence of high mortality in the course of "successful" accidental voyages may be found in Sharp's book.

The carrying capacity of the largest Polynesian sailing vessels is indicated in an account from early historical times that mentions a Tongan double canoe in which "two hundred and fifty souls," going on a military expedition, almost became lost at sea (Vason 1810:189–190). Elsewhere (Vayda 1958) I have shown that Sharp may have underestimated the role which exiles—people who may be described as deliberately losing themselves at sea—played in Polynesian "accidental" settlement, and I have cited Porter's account (1815:54) that the grandfather of a chief whom he met in Nukuhiva in the Marquesas in 1813 was said to have sailed with several families in four large canoes in search of land and to have not been heard of again. Yet if Sharp's views are accepted, it must be regarded as extremely unlikely that four such vessels would have made a landfall together after a long voyage. A passage by Sharp (1956:29) suggests how difficult it must have been for Polynesian canoes to keep together on the open ocean:

> Long journeys mean travel night after night with no assurance of fine weather. The ocean is too deep for anchors. How then could the vessels keep in touch at night in squalls, or when the sky was overcast? A practical test of this difficulty is to go out in similar circumstances on the sea in a small boat, or even to look out of the back door. The European sailing ships had the utmost difficulty in keeping together, even with high look-outs and telescopes and high masts to look for, and always used to appoint rendezvous at determined positions, so that when blown out of sight of one another they could come together again. The Spanish ships kept to an agreed line of latitude to facilitate their keeping together, having the advantage of quadrants to determine it, and yet were continually losing touch. Cook was separated from his second vessel on the second voyage, and did not see it again until both got back to England.

It is obviously not possible to make precise estimates of the usual size of the parties which survived or merely set out on accidental voyages in pre-European Polynesia. It can, however, be said that it is unlikely that there should have been many accidental landfalls by parties containing hundreds of people and, on the other hand, it is probable that some parties consisted of less than a dozen or so people.

Let us now consider the possibility of no very great numerical disparity between newly arrived accidental voyagers and established local people. A corollary of Sharp's thesis about the accidental nature of Polynesian long-distance voyaging is that long-distance voyagers would only rarely succeed in making landfalls (cf. Sharp 1956:123). From this it may be inferred that the initial accidental settlement of an island was not likely to be followed very quickly by new landfalls there. By the time that new accidental voyagers did arrive, the local population might have already swelled considerably from the original knot of settlers and might grossly outnumber the newcomers, even in the unlikely event that there were as many as 250 of the latter. Sharp (1956:48) has noted that conditions were particularly favorable for steady and progressive population increase from small beginnings in the high islands of Samoa, Tonga, Tahiti, the Marquesas, the Cooks, Hawaii, and New Zealand, for in these places there was room to expand and a sufficiency of food.

Conditions were different in the coral atolls and must be considered for suggesting the exceptions to Sharp's statement about the small impact of later arrivals to an island. Land and food supplies in the atolls were much more restricted than in the volcanic high islands. The latter have, in Goodenough's words (1957:152), "incomparably richer" soil, vegetation, and lithic resources. The possibilities of population expansion in the atolls were considerably smaller than in the high islands. Moreover, even when an atoll population had expanded to the limit set by the usually available food resources, it could quickly be reduced much more severely than could most high island populations. Cyclones and tidal waves wreak considerably greater devastation upon the small, low, exposed atolls than upon volcanic islands. In general, the atolls are also much more subject to the effects of drought, since, unlike many volcanic islands, they do not have springs or rivers or soils with any substantial water-holding capacity. Moreover, they have no interior mountains which would push rain-bearing winds upward to cooler heights and thereby cause greater precipitation on the land than at sea.

Both traditional and European accounts mention the decimation of atoll populations. A tidal wave about 300 years ago is said to have reduced Pukapukan population to "two women and fifteen men with remnants of their families" (Beaglehole 1938:386; cf. Beaglehole 1938:20–21). Mokil, a Micronesian atoll, was hit by a cyclone around the year 1775, and only 25 or 30 people are said to have survived (Weckler 1953:556). In historical times alone, many hundreds of natives in the Tuamotuan atolls have perished as a result of five separate cyclones of hurricane force (Danielsson 1955:24–27). The depopulating effect of droughts has also been noted for a number of atolls, such as the

Polynesian outlier of Kapingamarangi (Fischer 1958:11, 22). The extinction of a pre-European population in Olosenga atoll in the Tokelau Islands is attributed by Tokelau traditional history to starvation resulting from drought (Macgregor 1937:23).

These various considerations imply that the numerical disparity between local populations and parties of newly arrived accidental voyagers was generally likely to be much smaller in the coral atolls than in the high islands. It may be well in passing to note one way in which the disparity might be even further reduced in the atolls. This would happen if, by chance, disproportionately more of the established local people than the recent arrivals were to perish as a result of a cyclone, tidal wave, or drought, or even as a result of being carried away and becoming lost at sea in the course of making off-shore voyages such as were regularly undertaken between the neighboring atolls of Manihiki and Rakahanga in the Northern Cook Islands (cf. Buck 1932:4). The loss of one or two canoe-loads of voyagers would not very significantly diminish the numerical superiority of an established high-island population, but the effect might well be otherwise in the case of the smaller populations of the atolls.

The sometimes very small size of a total atoll population, as well as the number of newcomers relative to established local people, is an important consideration. Many traits on Burrows' lists represent items of behavior which presumably would be taught to a child by members of his household, and in a small population certain variant culture traits could, just as certain mutant genes, become established mainly through the "accidents" of who mates with whom and how many children result. A child might get variant culture traits as well as mutant genes from a parent. It may incidentally be pointed out that incest prohibitions among the local people may have promoted intermarriage with any new arrivals. Danielsson (1955:124) recently found on Raroia atoll in the Tuamotus that seven of the nine unmarried women of nubile age were prevented by the incest restrictions from finding mates among the eleven "mature" youths on the island. Such prohibitions are likely to have had equal or even greater force in pre-European times, except perhaps when a people were confronted with the alternative of incest or extinction.

Let us consider a hypothetical example in order to bring out the implications of small population size and of the absence of much disparity in the numbers of newcomers and local people. Suppose that a party of about 20 accidental voyagers arrives at an atoll whose population is at a low ebb. The newcomers intermarry with the local people, and as a matter of course assume the responsibility for at least part of the socialization of their children or possibly their grandchildren. This will involve the teaching of certain items of behavior which depart from local usage. For example, the men among the newcomers may teach variant techniques of adze-making and canoe-lashing and describing the supernatural, while the women, if any, may transmit at least to their female offspring certain new ways of preparing food and plaiting and twining. The result may be that many or most of the children of a certain generation—or possibly most of the boys or most of the girls—will have learned the variant

forms of certain traits, as taught by the newcomers, and will in turn transmit these to their own offspring. If the population builds up again and the descendants of the newcomers form a major part of it, certain of the introduced variant forms will be prevalent.

Fortunately we are not confined to mere speculation on these matters. The analysis of cultural transmission in small populations and the evidence of small and fluctuating populations in the coral atolls, taken together with Sharp's thesis about accidental voyaging, make possible certain predictions about the distribution of culture traits in the ethnographic present. If the premises are correct, we should find that in the coral atolls so situated as to be likely to receive voyagers from both western and eastern Polynesia, there would tend to be a more nearly equal representation of western and eastern traits than in the high islands similarly situated, since the later accidental voyagers would have been more able to introduce traits in the atolls than in the high islands. The expectation of a fair number of both western and eastern traits should apply also to coral atolls so situated as to be likely to receive voyagers not necessarily from both western and eastern Polynesia but rather from both western Polynesia and from other coral atolls so situated as to be likely to get both western and eastern voyagers. Consideration of geographical positions, wind and current directions, and the Polynesian voyages recorded in historical times (cf. Sharp 1956) makes our expectations applicable to the following atolls: Manihiki-Rakahanga, Tongareva (Penrhyn), and Pukapuka in the Northern Cook Islands, all likely to get voyagers from both eastern and western Polynesia; the Tokelau Islands, likely to get voyagers from western Polynesia and from the Cook atolls; and the Ellice Islands, likely to get voyagers from western Polynesia and from the atolls of both the Tokelau and Cook groups. The high islands which probably received voyagers from both western and eastern Polynesia include the Lower Cook Islands, the Society Islands, the Samoan Islands, Tonga, and Niue. The last named and also some of the islands in Tonga consist not of volcanic land but rather of coral-formed land which has been "raised." There are generally more environmental opportunities and diversity and certainly more land on such islands than on the typical low atolls.

The test of our expectations is provided by a tabulation that Burrows has made on the basis of the diagnostic western and central-marginal (eastern) traits given in the appendix to this paper. His reservations concerning the tabulation must be noted:

> For a number of reasons this list has no quantitative precision. First, the different traits are in no sense equivalent. Second, they have varying kinds and degrees of relationship to one another. Third, some of the traits classed as western or central-marginal in this simple dichotomy are more probably old Polynesian, superseded in one area or the other . . . Fourth, apparent absence of a trait in a given region may be due to incomplete data, as shown by the fact that the total number of traits listed differs for different regions. And real absence may be due to geographic environment rather than cultural factors. For example, regardless of cultural affiliation, the kava ceremony will not appear in an atoll where kava will not grow. Thus it is possible to

count regional affiliations from the foregoing list in several different ways. The list below gives one of these. However, counting in other ways does not substantially change the broad grouping which is all the list can pretend to show (Burrows 1938:90).

The broad grouping is sufficient for an initial test of our expectations. Recent fieldwork in some of the islands (for example, my own work in the Northern Cooks) has suggested the presence of certain traits which Burrows, on the basis of incomplete data, had to regard as being absent, but even such new evidence does not appear to change the broad picture. In Burrows' tabulation (1938:91) reproduced here, the islands of special interest in the present context are indicated by asterisks.

BURROWS' TABULATION OF WESTERN AND CENTRAL-MARGINAL TRAITS IN VARIOUS POLYNESIAN ISLANDS OR ISLAND GROUPS

Region	Western traits	Central-marginal traits
Uvea	38	2
*Tonga	36	5
*Samoa	36	5
Futuna	33	5
*Tokelaus	18	12
*Niue	18	13
*Ellice	12	14
*Pukapuka	12	19
*Tongareva	10	21
*Manihiki-Rakahanga	10	24
New Zealand	8	27
Easter Island	6	23
Mangareva	6	25
Marquesas	4	34
Australs	0	26
Rapa	0	28
Tuamotus	1	33
[*Lower] Cook Islands	2	36
Hawaii	1	36
*Society Islands	1	40

With the single exception of Niue, our expectations are realized. In the coral atolls of the Tokelaus, the Ellice Islands, and the Northern Cook Group, there is a more nearly equal representation of western and eastern traits than in the high islands of Tonga, Samoa, the Lower Cooks, and the Society Group.

Less significance should be attached to the great preponderance of western traits in Samoa and Tonga than to the great preponderance of eastern traits in the Lower Cooks and the Society Islands. This is because traits have been identified as "western" by Burrows largely on the very basis of their distinctive

occurrence in Samoa and Tonga; the only other "western" islands treated by Burrows are Uvea and Futuna. The "eastern" traits, however, can be characterized as such on account of their distribution in quite a few islands, e.g., the Marquesas, Mangareva, the Australs, and Rapa, excluding those under immediate consideration. This means that the very marked preponderance of eastern traits in the Lower Cooks and the Society Islands cannot be said to follow simply from our having designated certain traits as eastern because they occur in the two island groups.

Niue is anomalous. Its 64,228 acres of coral-formed land give it an area approximately 64 times that of some of the low atolls under consideration. Yams and some other food plants not usually found on the low atolls could be grown on the island (cf. Buck 1945:7). However, the land in Niue was clearly much less productive than in the volcanic islands being considered (compare Smith 1902:84, 91 ff. on Niue with Sahlins 1958:260–266 on the Society Islands and Samoa) and at the same time the Niueans could harvest less from the sea than could the true atoll-dwellers. On the western side of Niue, the amount of fish that could be caught was severely restricted by the lack of any natural harbor, beach, barrier reef, or other shallow water; on the eastern side, steep cliffs made access to the sea precarious, while constant winds from the southeast caused continuously rough seas (Department of Island Territories 1957: 82).

Moreover, Niue is visited by hurricanes about once in ten years, and a drought occurs nearly every year. According to Loeb's monograph (1926:6,111) on Niue, the people of the island were always subject to periodic famine due to long droughts. A severe dry season was "a great calamity."

In the light of such facts, it becomes possible to suggest that there may have been some major reductions of population in the course of Niuean prehistory. It is not necessary to suggest that the population was ever reduced, as in some of the low atolls, to a mere 20 or 30 people. What numbers of people can be regarded as constituting "small populations" is a problem, and it may be said that for cultural as well as for genetic studies (cf. Li 1955:325, 344 ff.) there is no clear-cut line between "large" and "small" populations. Here it is enough to suggest two things: first, that Niuean population may sometimes have been reduced to much smaller size than that to which the populations of the volcanic islands under consideration ever were reduced; and, second, that this smaller size may have been such that any relatively large parties of accidental voyagers would have made contributions to Niuean culture discernible in the ethnographic present.

In any case, the Niuean anomaly, for which there may be still other explanations, seems less significant than the fact that Burrows' tabulations agree so strikingly in all cases except the Niuean with the results predictable largely on the basis of the theoretical considerations which have been raised. This agreement seems significant indeed.

Before ending this paper, I should remark that Burrows presumably was working with the orthodox assumptions about Polynesian voyaging and settlement. That he has in spite of this provided a test for certain expectations or predictions derived from consideration of Sharp's thesis may be regarded as a welcome fortuity. Sharp's thesis, especially taken together with an analysis of cultural transmission in small populations and the evidence of small and fluctuating populations in the coral atolls, would lead us to look at—or look for—the data on the Northern Cooks, the Tokelaus, and the Ellice Islands even if they had somehow been omitted from Burrows' study of Polynesian cultural differentiation. It may be said that the importance of Sharp's thesis is that it leads us to ask new questions (or else to ask old questions more meaningfully than before) and sometimes to look for new data.

CONCLUSION

In this paper, I have tried to indicate some of the ways in which Sharp's thesis raises questions, particularly about cultural distributions within Polynesia. My discussion has been limited to cultural traits which probably could have been "conveyed" and perpetuated from one island to the other by relatively small parties of people making accidental landfalls. If Sharp's thesis is accepted, certain statements about such traits may be regarded as conclusions in light of the thesis.

(1) Inter-island similarities in the case of traits which would have been obviously useful innovations (e.g., certain subsistence techniques) cannot be relied on as evidence of a population's origins. The traits might have been introduced by later voyagers from a different area than the one from which the population originally came.

(2) Although due allowances must be made for the possibility of independent invention, similarities in traits which would not have been clearly useful innovations (e.g., most of the items on Burrows' lists) can be employed with reference to most islands as evidence (or at least as indications) of the general area (e.g., eastern or western Polynesia) from which the first permanent settlers came.

(3) However, even these similarities cannot be so employed with reference to some islands, such as the coral atolls, where the population, after as well as during the early settlement period, may sometimes have been small enough so that new parties of accidental voyagers could introduce certain traits even if they possessed no marked advantages over traits which had been established previously.

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Appendix: List of Western and Central-I
Traits (from Burrows 1938:

WESTERN	C
Absence of simple fish-hooks	Simple fis
Absence of *Ruvettus* hooks	*Ruvettus* h
Bonito hooks with proximal projection on point	Bonito ho projecti
Absence of food pounders other than temporary makeshifts	Food pou
Bark cloth beaten without retting	Retting b
Pasting bark cloth	Felting ba
Absence of watermarking in bark cloth	Waterma
Decoration of bark cloth by tablet rubbing	Decoratio
Right-angle plaiting in mats and baskets	Absence and bas
Coiled basketry	Absence c
Absence of twining in kilts	Twining i
Tangless stone adzes	Tanged st
Support of house ridge-poles by king-posts	Absence nesia; a central
Rounded house-ends with parallel rafters or arched purlins	Absence ginal radial r
Canoe hulls with low ends, decorated with rows of toothed projections	Canoe hu mentall forms t
Flange lashing of canoe planks	Right-thr
Indirect outrigger attachment	Direct ou Polynes Polynes
Five or more outrigger booms	Two, mor booms
Oceanic lateen sail	Oceanic s
Absence of carved human figures	Carved h
Throwing club	Double-p
Composite dart	Simple da
Wooden slit-gong	Drum
Panpipes	Musical b
Kava bowl and kava ceremony	Absence ceremo
Chiefs' language	Absence o
Kinship terms distinguishing father from mother	Father a termino
Terms distinguishing son and daughter, man speaking, from son and daughter, woman speaking	Same ter gardless